WHAT IS CLAIMED IS:

- 1. A method of inhibiting Mad2 function comprising contacting a Mad2 protein with a peptide that binds Mad2.
- 2. The method of claim 1, wherein said peptide is 9 to about 20 residues in length.
- 5 3. The method of claim 2, wherein said peptide is 12 residues in length.
 - 4. The method of claim 2, wherein said peptide comprises a core sequence represented by the formula $X_1X_2X_3X_4X_5X_6X_7X_8X_9$, wherein:

 X_1 can be any amino acid;

X₂ and X₃ are hydrophobic residues;

 X_4 is a basic residue;

 X_5 is a hydrophobic residue; and

at least one of X_6 to X_9 is P.

- 5. The method of claim 4, wherein at least two of X_6 to X_9 are P.
- 6. The method of claim 4, wherein said peptide comprise at least on other P.
- 7. The method of claim 1, wherein the peptide comprises the sequence

QWYKLX₆PP, SWYSYPPPQRAV, or DARIIKLPVPKP.

- 8. The method of claim 1, wherein said peptide is present in a molar excess of Mad2.
- 9. The method of claim 1, wherein said peptide is present in a 5-fold molar excess of Mad2.
- 10. The method of claim 1, wherein said peptide is present in a 10-fold molar excess of Mad2.

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- 11. The method of claim 1, wherein said peptide is present in a 100-fold molar excess of Mad2.
- 12. The method of claim 1, wherein said peptide is delivered to a cell comprising said Mad2.
- 13. The method of claim 12, wherein said peptide is encapsulated in a liposome.
- 5 14. The method of claim 1, wherein a nucleic acid encoding said peptide and a promoter is delivered to a cell comprising said Mad2.
 - 15. The method of claim 14, wherein said promoter is selected from the group consisting of CMV IE, RSV, and SV40 large T.
 - 16. The method of claim 14, wherein said nucleic acid further comprises a polyadenylation signal.
 - 17. The method of claim 14, wherein said nucleic acid is located in a viral vector.
 - 18. The method of claim 17, wherein said viral vector is selected from the group consisting of retrovirus, adenovirus, adeno-associated virus, vaccinia virus, herpesvirus and polyoma virus.
 - 19. The method of claim 1, wherein said Mad2 is located in a cancer cell.
 - 20. The method of claim 19, further comprising contacting said cell with a DNA damaging agent.
 - 21. The method of claim 20, wherein said DNA damaging agent is radiation.
- The method of claim 21, wherein said radiation is x-irradiation, γ-irradiation, uv irradiation, and microwave irradiation.
 - 23. The method of claim 20, wherein said DNA damaging agent is a DNA damaging chemotherapeutic agent.
 - 24. The method of claim 23, wherein said chemotherapeutic agent is a microtubule inhibitor or an anti-mitotic agent.

- 25. The method of claim 19, further comprising contacting said cancer cell with taxol.
- 26. The method of claim 1, wherein said peptide is linked to a nuclear targeting molecule.
- 27. The method of claim 26, wherein said nuclear targeting molecule is an SV40 nuclear localization signal.
- 5 28. A method of inhibiting Mad2 function comprising contacting a Mad2 protein with a peptide-mimic that binds to Mad2.
 - 29. A method of inhibiting cancer cell proliferation comprising contacting a Mad2 protein with a peptide or peptide-mimic that binds to Mad2.
 - 30. The method of claim 29, wherein said cancer cell is killed.
 - 31. The method of claim 29, wherein said cancer cell is a prostate cancer cell, a breast cancer cell, a lung cancer cell, a brain cancer cell, a liver cancer cell, a pancreatic cancer cell, a stomach cancer cell, a colon cancer cell, an ovarian cancer cell, a testicular cancer cell, a head & neck cancer cell, a throat cancer cell and an esophageal cancer cell.
 - 32. A method of treating cancer in a subject comprising administering to cancer cells of said subject a peptide or peptide-mimic that binds to Mad2.
 - 33. The method of claim 31, wherein said subject is a human.
 - 34. The method of claim 32, further comprising administering to said patient a second cancer therapy.
 - 35. The method of claim 34, wherein said second cancer therapy is a DNA damaging agent.
- 20 36. The method of claim 35, wherein said DNA damaging agent is ionizing radiation.
 - 37. The method of claim 35, wherein said DNA damaging agent is a chemotherapeutic agent.
 - 38. The method of claim 34, wherein said second cancer therapy is taxol.
 - 39. A method of screening for an anti-cancer agent comprising:

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- (a) providing a target polypeptide comprising at least the cdc20 binding domain of Mad2;
- (b) contacting said target polypeptide with a candidate substance;
- (c) determining the binding of said candidate substance to said target polypeptide; and
- (d) in case of positive target polypeptide binding, screening for an anti-cancer effect.
- 40. The method of claim 39, wherein said candidate substance is a peptide.
- 41. The method of claim 40, wherein said peptide is selected from a peptide library.
- 42. The method of claim 39, wherein step (d) comprises admixing said candidate substance with a cancer cell and measuring one or more characteristics of said cancer cell.
- 43. The method of claim 42, wherein said characteristics include cell growth, cell viability, cell shape or cell differentiation.
- 44. The method claim 40, wherein step (d) comprises contacting an expression vector encoding said peptide with a cancer cell and measuring one or more characteristics of said cancer cell.
- 45. The method of claim 39, wherein said target peptide is expressed on the surface of a phage.